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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/807,946	04/20/2001	Rebecca E. Cahoon	BB1410PCT	9292

7590 10/18/2006

E I du Pont de Nemours & Company
Legal Patents
Wilmington, DE 19898

EXAMINER	
BAUM, STUART F	

ART UNIT	PAPER NUMBER
1638	

DATE MAILED: 10/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/807,946	CAHOON ET AL.	
	Examiner	Art Unit	
	Stuart F. Baum	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 November 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-15 and 19-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-15 and 20-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/14/2002*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1, 3-15 and 19-29 are pending.

2. Applicant's election with traverse of Group I, claims 1, 3-15 and 19-29, including SEQ ID NO:5 encoding SEQ ID NO:6 in the reply filed on 11/30/2005 is acknowledged. The traversal is on the ground(s) that the Office has not asserted that Group I is independent of Group III, and does not show a separate classification (page 8 of Remarks, 2nd paragraph). Applicants contend the Office has not shown that there exists a serious burden on the Examiner to search both Groups. Applicants contend the restriction imposes a limitation not recited in the claims.

This is not found persuasive because the claims of Group III are drawn to polynucleotide fragments comprising at least 30 nucleotides. The Office contends that one skilled in the art would recognize that a polynucleotide comprising 30 nucleotides would be used as a probe or primer and would not be used to encode a polypeptide, especially when the full length polypeptide comprises more than two hundred amino acids. In regards to the classification, a lack of unity does not require that the classification be stipulated, but in the instant case, probes and primers are classified under Class 536, subclass 24.33 for example. And lastly, while the search of the prior art for one group may overlap with that of another, they are not co-extensive of each other and thus would be a burden on the Office.

Applicants contend that SEQ ID NO:7 encodes SEQ ID NO:8, and that SEQ ID NO:6 and 8 have greater than 99% sequence identity to each other and differ in length by only one amino acid residue (page 8 of Remarks, 3rd paragraph and sequence alignment in Appendix filed with Remarks). Applicants contend SEQ ID NO:5 and 7 have greater than 99% sequence identity to each other (paragraph bridging pages 8 and 9 of Remarks).

SEQ ID NO:7 encoding SEQ ID NO:8 will be examined in the present office action.

The requirement is still deemed proper and is therefore made FINAL.

Claims 2, 16-18 and 30-35 have been canceled.

3. Claims 1, 3-15 and 20-29, including SEQ ID NO:5, 6, 7 and 8 are examined in the present office action.

Specification

4. This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required.

The subject matter of this application admits of illustration by a drawing to facilitate understanding of the invention. Applicant is required to furnish a drawing under 37 CFR 1.81(c). No new matter may be introduced in the required drawing. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d).

Priority

5. Objection is made to the specification for improperly claiming the benefit of a provisional application. 37 CFR 1.78(a)(5)(i) requires that any nonprovisional application or international application designating the United States of America claiming the benefit of one or more prior-filed provisional applications must contain or be amended to contain a reference to

each such prior-filed provisional application, identifying it by the provisional application number (consisting of series code and serial number). Amending the first paragraph of the specification to recite "This application is the National Stage of International Application No. PCT/US00/26648, filed 9/28/2000, which claims the benefit under 35 U.S.C. § 119(e) of U.S. Provisional Application 60/157,216, filed 10/01/1999" will obviate the objection.

Claim Objection

6. Claims 6, 7, 11 and 26 are objected to for reciting "any one of claims 1, 3, 4 *or* 5" instead of --any one of claims 1, 3, 4 *and* 5--.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1, 5-15 and 19-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The rejection includes dependent claims.

Claim 1 is indefinite for reciting "...at least 100 amino acids, wherein the amino acid sequence of the polypeptide and SEQ ID NO:6 have at least 80% identity...". It is unclear how a nucleic acid molecule can encode a polypeptide having 100 amino acids and encode a polypeptide having at least 80% identity with SEQ ID NO:6. SEQ ID NO:6 is 238 amino acids in length. A polypeptide having 100 amino acids would exhibit 42% identity with SEQ ID NO:6.

Claim 5 is indefinite for reciting "wherein the WUS protein.".

Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. Applicant does not recite an expression. The preamble and last method step are not congruent.

Claim 11 is indefinite for the recitation "suitable". Applicants have not disclosed the metes and bounds of "suitable". Applicants have not disclosed the upper and lower limits of suitable, and what regulatory sequence would not be suitable.

Claim 19 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. Claim 19 is drawn to a method for inducing meristem proliferation in a plant cell but the last step recites inducing expression of the polynucleotide to produce a transformed meristem. The preamble and last method step are not congruent.

Written Description

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 1, 5-15 and 19-29 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The claims are drawn to an isolated polynucleotide comprising a nucleotide sequence encoding a polypeptide comprising at least 100 amino acids, wherein the amino acid sequence of the polypeptide and SEQ ID NO:6 have at least 80% identity, the complement thereof, a chimeric gene comprising said polynucleotide operably linked to a regulatory sequence, a transgenic plant or cell comprising said chimeric gene, and methods comprising said chimeric gene or said polynucleotide.

Applicants disclose that their invention was isolated from cDNA library p0016, made from corn tassel shoots, pooled, 0.1-1.4 cm (page 21, Table 2). Applicants disclose the sequence of cDNA clone p0016.ctsas50r is SEQ ID NO:5 encoding SEQ ID NO:6 (page 5, Table 1).

Applicants do not identify essential regions of the protein encoded by SEQ ID NO:5, nor do Applicants describe any polynucleotide sequences that encode a protein having 80% identity with SEQ ID NO:6 and encode a functional protein.

The Federal Circuit has recently clarified the application of the written description requirement to inventions in the field of biotechnology. See University of California v. Eli Lilly and Co., 119 F.3d 1559, 1568, 43 USPQ2d 1398, 1406 (Fed. Cir. 1997). In summary, the court stated that a written description of an invention requires a precise definition, one that defines the structural features of the chemical genus that distinguishes it from other chemical structures. A definition by function does not suffice to define the genus because it is only an indication of what the gene does, rather than what it is. The court goes on to say, "A description of a genus of cDNAs may be achieved by means of a recitation of a representative number of cDNAs, defined by nucleotide sequence, falling within the scope of the genus or of a recitation of structural features common to members of the genus, which features constitute a substantial portion of the

genus." *See University of California v. Eli Lilly and Co.*, 119 F.3d 1559; 43 USPQ2d 1398, 1406 (Fed. Cir. 1997).

Applicants fail to describe a representative number of polynucleotide sequences from a representative number of plant species encoding a protein of SEQ ID NO:6 falling within the scope of the claimed genus of polynucleotides which encode a protein having at least 80% identity to SEQ ID NO:6. Applicants only describe a single cDNA sequence of SEQ ID NO:5. Furthermore, Applicants fail to describe structural features common to members of the claimed genus of polynucleotides. Hence, Applicants fail to meet either prong of the two-prong test set forth by *Eli Lilly*. Furthermore, given the lack of description of the necessary elements essential for the protein encoded by SEQ ID NO:5, it remains unclear what features identify a protein of SEQ ID NO:6. Since the genus of said proteins has not been described by specific structural features, the specification fails to provide an adequate written description to support the breath of the claims.

Enablement

9. Claims 1, 3-15 and 20-29 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The claimed invention is not supported by an enabling disclosure taking into account the *Wands* factors. *In re Wands,* 858/F.2d 731, 8 USPQ2d 1400 (Fed. Cir. 1988). *In re Wands* lists a number of factors for determining whether or not undue experimentation would be required by

one skilled in the art to make and/or use the invention. These factors are: the quantity of experimentation necessary, the amount of direction or guidance presented, the presence or absence of working examples of the invention, the nature of the invention, the state of the prior art, the relative skill of those in the art, the predictability or unpredictability of the art, and the breadth of the claim.

The claims are drawn to an isolated polynucleotide comprising a nucleotide sequence encoding a polypeptide comprising at least 100 amino acids, wherein the amino acid sequence of the polypeptide and SEQ ID NO:6 have at least 80% identity, or the complement thereof, a chimeric gene comprising said polynucleotide operably linked to a regulatory sequence, a transgenic plant comprising said chimeric gene, a method for transiently modulating the level of WUS protein in a plant cell, a method for inducing meristem proliferation in a plant cell comprising transforming a plant cell with said chimeric gene, a method for positive selection of a transformed cell comprising transforming a plant cell with said chimeric gene or wherein said polynucleotide is excised or wherein said polynucleotide is flanked by FRT sequences to allow FLP mediated excision of the polynucleotide, or a method for transforming a cell comprising introducing said polynucleotide into a cell.

Applicants disclose that their invention was isolated from cDNA library p0016, made from corn tassel shoots, pooled, 0.1-1.4 cm (page 21, Table 2). Applicants disclose the sequence of cDNA clone p0016.ctsas50r is SEQ ID NO:5 encoding SEQ ID NO:6 (page 5, Table 1).

Applicants have not reduced to practice the invention. The specification fails to provide guidance for one of skill in the art how to make and/or use the claimed invention. Applicants have not transformed a plant cell or plant with any of the claimed sequences to produce a plant

cell or plant with induced meristem formation, or used any of the claimed sequences to induce organogenesis and provide a positive selection means for any transformed cell. Applicants have only disclosed from where clone SEQ ID NO:5 was isolated. Applicants have not disclosed the relationship of SEQ ID NO:5 or SEQ ID NO:6 with the other isolated sequences other than SEQ ID NO:7 and 8 (see above), which are other sequences from corn. Applicants have not taught how one skilled in the art can use the claimed sequences to generate a plant with an agronomically useful phenotype without having to do additional undue experimentation in order to achieve the desired results. In addition, Applicants have not taught how one skilled in the art would use a plant transformed with any of the claimed sequences.

Applicants have not provided examples or guidance for selecting a sequence out of the multitude of sequences that are encompassed by Applicants' broad claim language, that gives the expected results when transformed into a plant. Transforming plants with a WUSCHEL (WUS) gene produce unexpected results. Kamiya et al (2003, The Plant Journal 35:429-441) disclose isolating a WUS homolog, QHB, from rice and transforming rice plants with the isolated gene operably linked to a constitutive promoter. Rice plants overproducing the QHB transcript showed abnormal phenotypes in the leaves and roots. Crown roots did not develop and the development of the aerial part of the plant was abnormal, i.e., dwarf plants and multiple shoot phenotypes (pages 435-436, "Overexpression of the QHB and AtWUS gene in the transgenic rice plants"). Kamiya et al also disclose that rice plants transformed with the Arabidopsis WUS gene also produced ectopic shoot apical meristems that were malformed, as well as aberrant shoot development (page 436, paragraph bridging left and right columns, and 1st full paragraph of the right column).

The state-of-the-art is such that one of skill in the art cannot predict which nucleic acid that encodes a protein having at least 80% sequence identity to SEQ ID NO:6 will encode a protein with the same activity as a protein encoded by SEQ ID NO:5. The prediction of protein structure from sequence data and, in turn, utilizing predicted structural determinations to ascertain functional aspects of the protein, is extremely complex, and the positions within the protein's sequence where amino acid substitutions can be made with a reasonable expectation of maintaining function are limited (Bowie et al, Science 247:1306-1310, 1990, see especially page 1306). Proteins may be sensitive to alterations in even a single amino acid in a sequence. For example, the replacement of a glycine residue located within the START domain of either the PHABULOSA or PHAVOLUTA protein receptor with either an alanine or aspartic acid residue, alters the sterol/lipid binding domain (McConnell et al, Nature 411 (6838):709-713, 2001, see especially page 710, left column, 2nd paragraph).

Re: claims 24 and 25 are drawn to excising the polynucleotide or excising the polynucleotide using FRT sequences to allow FLP mediated excision of the polynucleotide. The state-of-the-art teaches using FLP site specific recombination produces unexpected results. Recent studies by Gidoni et al (2001 Euphytica 121: 145-156) of embryonal recombination and germline inheritance of recombined tobacco loci show variable recombination efficiencies (pages 146 and 152). The claimed methods require use of site-specific recombination systems to delete appropriately flanked DNA sequences.

Applicants have not disclosed how one makes or isolates any of the sequences that are encompassed by Applicants' broad claims. Applicants have not taught which regions of the

respective polynucleotides can be used to amplify any of said polynucleotides or which regions can be used as a probe to isolate any of said polynucleotide sequences.

In the absence of guidance, undue trial and error experimentation would be required for one of ordinary skill in the art to screen through the multitude of non-exemplified sequences, either by using non-disclosed fragments of SEQ ID NO:5 as probes or by designing primers to undisclosed regions of SEQ ID NO:6 and isolating or amplifying fragments, subcloning the fragments, producing expression vectors and transforming plants therewith, in order to identify those, if any, that when over-expressed produce ectopic meristems or induce organogenesis in a transformed cell.

Therefore, given the breadth of the claims; the lack of guidance and examples; the unpredictability in the art; and the state-of-the-art as discussed above, undue experimentation would be required to practice the claimed invention, and therefore the invention is not enabled.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

10. Claims 26 and 28 are rejected under 35 USC 101 because the claimed invention is directed to non-statutory subject matter.

The claims recites "A cell comprising" which reads on a human being. Amending the claim to recite "An isolated cell" will obviate the rejection.

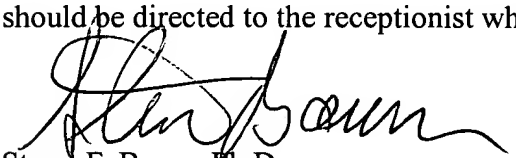
11. Claims 1, 3-15 and 20-29 are deemed free of the prior art, given the failure of the prior art to teach or reasonably suggest an isolated polynucleotide of SEQ ID NO:5 encoding SEQ ID NO:6 or an isolated polynucleotide of SEQ ID NO:7 encoding SEQ ID NO:8, a method for transiently modulating the level of WUS protein in a plant cell, a method for inducing meristem proliferation in a plant cell and method for positive selection of a transformed cell comprising said polynucleotide, or plant, plant cell or plant seed comprising said isolated polynucleotide.

12. No claims are allowed.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stuart F. Baum whose telephone number is 571-272-0792. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg can be reached at 571-272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-1600.



Stuart F. Baum Ph.D.
Primary Examiner
Art Unit 1638
October 13, 2006